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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,132	03/25/2002	Weng-Hsing Huang	MXIP0081USA	5972

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NAIPO (NORTH AMERICA INTERNATIONAL PATENT OFFICE)
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EXAMINER	
DEO, DUY VU NGUYEN	

ART UNIT	PAPER NUMBER
1765	2

DATE MAILED: 08/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/063,132	HUANG ET AL.	
	Examiner	Art Unit	
	DuyVu n Deo	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 March 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 March 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-4, 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Shiozawa et al. (US 6,482,718).

Shiozawa describes a method for forming trench isolation comprising: providing a silicon substrate having top surface (col. 5, line 44); forming a trench-patterned mask on the substrate exposing an unmasked trench region of the substrate, the mask comprising a thermal oxide (claimed pad oxide layer) and a silicon nitride layer on the pad oxide (col. 5, line 43-45, line 65-

col. 6, line 1; figure 3); etching the unmasked region of the substrate to form a trench in the substrate (col. 6, line 14-17); simultaneously oxidizing the silicon nitride layer and the substrate of the trench to form a thermal oxide film (this would read on claimed to form an in-situ steam growth film) (col. 6, line 22-26, line 35-38); depositing a dielectric layer to fill the trench and cover the mask layer (col. 6, line 58-60); planarizing the dielectric layer with the silicon nitride surface as a stop layer (this would expose the silicon nitride) (col. 6, line 65-67; figure 7); and removing the nitride (claimed stripping the silicon nitride) (col. 7, line 1-3).

Since the thermal oxide is formed by the same method as the claim by oxidizing both the nitride and the substrate, this oxide film would also reinforces an interface between the dielectric layer and the substrate to prevent acid penetration and acid-corroded seams being formed during a acid solution dipping process.

Referring to claim 2, the thermal oxidization of the nitride and substrate would read on claimed in-situ steam growth method.

Referring to claim 3, the thermal oxide layer is formed with the thickness to be not more than 50 nm (or 500 angstrom) (col. 6, line 29-31). This would also include claimed 50-250 angstrom.

Referring to claim 4, the dielectric layer is formed by HDP-CVD process (col. 6, line 58-61) or claimed HDP oxide layer.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiozawa as applied to claim 1 above, and further in view of admitted prior art.

Referring to claims 5 and 6, Shiozawa doesn't describe performing a silicon oxide etching process to remove residual oxide on the nitride layer and simultaneously etch the dielectric layer of the trench using DHF solution. Admitted prior art (pages 2 and 3 of specification) teaches a same conventional process of forming trench isolation where it describes performing a silicon oxide etching process to remove residual oxide on the nitride layer and simultaneously etch the dielectric layer of the trench using DHF solution. It would have been obvious for one skill in the art to modify Shiozawa in light of admitted prior art because it teaches that this step is performed in order to clean the substrate (page 2, paragraph [0008]).

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiozawa as applied to claim 1 above, and further in view of Cheng et al. (US 6,541,382).

Referring to claim 7, Shiozawa is silent about removing the nitride by a 160 degrees Celsius phosphoric acid solution. Cheng teaches a same method of forming trench isolation where he teaches of removing the nitride layer using a phosphoric acid solution having T of 160-180 degrees Celsius (col. 6, line 20-21). It would have been obvious at the time of the invention for one skill in the art to modify Shiozawa in light of Cheng's teaching of nitride etching solution because Cheng further describes specific etchant and its T, which are silent in Shiozawa, to remove nitride with a reasonable expectation of success.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 1 recites the limitation "the acid solution dipping process." There is insufficient antecedent basis for this limitation in the claim.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1-8 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3-7 of copending Application No. 10/063131 (referring to as '131) in view of Shiozawa et al. (US 6,482,718).

Claims 1, 3-7 of application '131 describes substantially same steps as that of claims 1, 3-7. Unlike claimed invention, referring to claims 1 and 2, claims of application '131 do not describe depositing the HTO by oxidizing the nitride and substrate. Shiozawa describes a same method for forming trench isolation wherein he teaches of forming a thermal oxide (or high temperature oxide) by oxidizing the nitride and the substrate (col. 6, line 21-22, line 35-38). This method of forming thermal oxide on the substrate and nitride layer would read on claimed in-situ steam growth method. It would have been obvious for one skill in the art to form a oxide layer in light of Shiozawa because Shiozawa further describes specific technique, which is silent in

claim 1 of application '131, that is known to one skill in the art in order to oxide layer on the nitride and the substrate with a reasonable expectation of success.

Referring to claim 8, Shiozawa further describe the substrate for forming trench isolation is silicon (col. 5, line 44).

This is a provisional obviousness-type double patenting rejection.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD
July 28, 2003